Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Policies and Rules for Processing Applications in the Direct Broadcast Satellite Service	)	**IB Docket No. 06-160**
	)	
Feasibility of Reduced Orbital Spacing for Provision of Direct Broadcast Satellite Service in the United States	)	**Report No. SPB-196**

REPLY COMMENTS OF TELESAT CANADA

January 25, 2007

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REPLY COMMENTS OF TELESAT CANADA

Telesat Canada ("Telesat") is pleased to provide these reply comments in the above captioned Notice of Proposed Rulemaking ("NPRM") proceeding.

I. Introduction & Summary

Telesat is the Canadian-licensed satellite operator of the Nimiq DBS satellites operating at 91.1° WL and 82° WL that, through the Canadian DBS service provider Bell ExpressVu, provide DBS service to more than 1.8 million households in Canada. Most of these subscribers live within 100 km of the U.S. border, and many, in the densely populated Southern Ontario region, live geographically south of portions of the neighboring U.S. states of New York and Michigan. These satellites, which have coverage footprints that include the Continental United States, have also been approved

by the Commission for the delivery of DBS services in the United States.[1] Telesat also holds the Canadian authorization for the development of the DBS slot at 72.7° WL, and is currently operating an interim satellite at this position to allow DIRECTV to provide DBS services in the United States as authorized by the Commission.[2]

The associated ITU Region 2 AP30/30A BSS Plan entries for these three Canadian positions, CAN-BSS1, CAN-BSS2, and CAN-BSS3 for 82° WL, 91.1° and 72.7°WL respectively, show coverage patterns that include both Canada and the Continental United States.[3] The separation of the three Telesat BSS orbital positions is consistent with the international assignment of DBS locations spaced approximately nine degrees for co-coverage service. Like DIRECTV, Telesat has viewed this internationally agreed-upon separation as a "bedrock assumption" upon which it has predicated its billion-dollar investment, service and technology decisions in the DBS marketplace over the past several years. (DIRECTV Comments at ii)

This "bedrock assumption" may be irrevocably altered as a result of this NPRM proceeding examining the feasibility of reduced orbital spacing for provision of DBS service in the U.S., and the consequences could be dire. In particular, as discussed in more detail below, Telesat agrees with the study results presented by DIRECTV and EchoStar that the interference caused by short-spaced satellites could have immediate and long-term devastating effects on existing DBS networks, Telesat's DBS networks included.

Telesat also supports the argument that, if the Commission does ultimately decide to authorize short-spaced DBS satellites to any degree, the conditions under which this is

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[1] See Digital Broadband Applications Corp., *Order*, 18 FCC Rcd 9455 (Int'l. Bur. 2003) (authorizing DBAC to provide two-way broadband data and video services using one million satellite home terminals in the U.S. from Nimiq 1 and Nimiq 2 at orbital locations 91°W.L. and 82°W.L.); and Pegasus Development Corp., *Order*, 19 FCC Rcd 6080 (Int'l. Bur. 2004) (service to one million satellite home terminals from Nimiq 1 and Nimiq 2).

[2] See DIRECTV Enterprises, LLC, 19 FCC Rcd. 15529 (Int'l Bur. 2004); and DIRECTV Enterprises, LLC, 20 FCC Rcd. 11772 (Int'l Bur. 2005).

[3] CAN-BSS1 and CAN-BSS2 became part of the Region 2 Plan as of 9 September 2003 with their publication in Part II of ITU-R IFIC 2502. CAN-BSS-3 became part of the Region 2 Plan as of 17 May 2005 with its publication in Part II of ITU-R IFIC 2544.

allowed must be such that existing networks (including Telesat's networks) remain protected. As DIRECTV suggests, the guiding principle followed by the Commission in its public interest deliberations on this matter should be "First, do no harm." (DIRECTV Comments at 9)

Telesat would take this a step further to note that the feasibility of reduced orbital spacing for provision of DBS service in the U.S. is not simply a domestic licensing issue. This is an internationally planned band and any modifications to Region 2 Plan entries must be in accordance with the requirements and procedures set out in the Plan. Moreover, changes to any of the technical provisions and parameters underpinning the Plan, particularly those relating to reduced orbital spacing, cannot be implemented unilaterally by any Administration, but rather can only be arrived at through discussions and agreement at the appropriate international venue.

II. The impact of short-spaced DBS satellites on existing DBS systems could be catastrophic.

As EchoStar observes in its Comments, since the first DBS satellite was launched in 1993, the DBS industry has grown dramatically and has become an important source of competition in the multichannel video programming distributor ("MVPD") market. (EchoStar Comments at 1) DIRECTV similarly observes that since its launch a dozen years ago, it has "...invested billions of dollars in a process of constantly upgrading its all-digital technology to increase the number and variety of its service offerings, from local broadcast and high definition programming to interactive television and personal video recorders", and that "[s]uch investment and innovation have been crucial in DIRECTV's efforts to compete vigorously in the MVPD market." (DIRECTV Comments at i) Telesat and its service-provider partner Bell ExpressVu have similarly invested over a billion dollars in developing their DBS networks to bring the full range of high-quality and leading-edge digital services to their end-user customers, both in direct competition with terrestrial MVPD alternatives and in rural and remote areas where no such terrestrial alternatives are available now or ever likely to be available. As a direct

result of this massive investment, the three major North American DBS systems currently deliver several hundred broadcast signals to over 28 million subscribers in aggregate across the continent.

DIRECTV further observes, and Telesat agrees, that this progress has been made possible in large measure by the international assignment of DBS orbital locations, which effectively established nine-degree spacing between co-coverage orbital locations. (DIRECTV Comments at i) This degree of separation has provided the existing systems with the flexibility and protection required to exploit their DBS orbital assignments to the maximum extent possible for the benefit of their subscribers. Telesat further agrees with DIRECTV and EchoStar that the interference introduced by short-spaced satellites poses a serious threat to the existing operators' ability to maintain their current level and quality of service, let alone continue to augment and improve upon that level and quality of service.

EchoStar notes the increasing reliance of DBS providers on double and triple feed receive antennas to allow a much larger selection of programming channels to be made available to all customers in a cost-effective and consumer-friendly manner. By necessity these dishes have lower off-axis gain discrimination than single-feed antennas, which means that they are more susceptible to interference from short-spaced satellites. (EchoStar Comments at 6 and A-8 to A-11 of its Technical Annex).

Mispointing of already-installed subscriber dishes is a serious concern associated with the introduction of tweener satellites. SES Americom (at 4 of its Technical Appendix) and Spectrum Five (at 10 of its Technical Exhibit) both attempt to downplay the impact of pointing error, arguing that if an antenna is mispointed, then the increase in interference in one direction will be effectively "cancelled out" by the reduction of interference in the opposite direction. However, this does not take into account the actual emission patterns of DBS antennas and can easily be proven erroneous.

As EchoStar explains, a mispointed antenna in a nine-degree orbital spacing environment may still provide acceptable service because the error is not large enough for the desired signal to be lost. However, with the introduction of tweener satellites such mispointed installations would suddenly experience much higher levels of interference, resulting in a sudden complete loss of service or much higher outages than previously experienced, a hypothesis that is supported by a comparative analysis of the results in Tables 1 and 2 below. (EchoStar Comments at 6 and A-11 and A-12 of the Technical Annex)

Table 1 provides a comparison of the aggregate C/I values in a homogenous 4.5 degree nominal spacing environment for two reference antenna patterns when a 45 cm receive antenna is mispointed by up to 1.5 degrees. For analysis purposes it is assumed that the antenna is mispointed to the East. By comparing the calculated C/I "aggregate" values for 0, 0.5, 1.0, and 1.5 degrees of mispointing, it can be seen that mispointing does have a major impact when the appropriate reference receive antenna pattern is considered. For example, using the FCC 25.209 reference antenna pattern that was chosen by Spectrum Five for their analysis (at 10 of its Technical Exhibit), the aggregate C/I is reduced by less than one dB from a value of 19.1 dB with no mispointing, to a value of 18.3 dB with one degree mispointing. However, the FCC 25.209 pattern is intended for FSS antennas. The internationally accepted reference antenna pattern for DBS is that contained in ITU-R Recommendation BO.1213. Using this pattern Table 1 shows that the aggregate C/I drops substantially from a value of 18.0 dB with no mispointing, to a value of 12.9 dB with one degree mispointing.

Table 1: Comparison of aggregate downlink C/I values for various angles of mispointing for two antenna patterns, in homogenous 4.5 degree nominal spacing environment

Geo Spacing 4.5 degrees

Antenna Pattern	**ITU-R BO.1213**			**FCC 25.209**		
Antenna Mispointing to East (degrees)	C/I Due to ASI (dB)			C/I Due to ASI (dB)		
	East	West	Aggregate	East	West	Aggregate
0	21.0	21.0	18.0	22.1	22.1	19.1
0.5	16.9	23.1	16.0	20.9	23.1	18.9
1.0	13.3	24.1	12.9	19.6	24.1	18.3
1.5	10.1	25.0	10.0	18.1	25.0	17.3

The results in Table 1 invalidate the conjecture by both SES Americom and Spectrum Five that the increase of interference due to mispointing in one direction would be approximately offset by the reduction of interference in the opposite direction.

Table 2 shows that mispointing would be a much less significant factor in a homogenous nine-degree spacing environment, regardless of the chosen reference antenna pattern, because of the relatively high aggregate C/I values.

Table 2: Comparison of aggregate downlink C/I values for various angles of mispointing for two antenna patterns, in homogenous nine-degree nominal spacing environment

Geo Spacing 9 degrees

Antenna Pattern	**ITU-R BO.1213**			**FCC 25.209**		
Antenna Mispointing to East (degrees)	C/I due to ASI (dB)			C/I due to ASI (dB)		
	East	West	Aggregate	East	West	Aggregate
0	29.7	29.7	26.7	26.7	26.7	23.7
0.5	29.2	30.3	26.7	26.2	27.3	23.7
1.0	28.6	30.8	26.5	25.9	27.8	23.7
1.5	27.9	31.3	26.3	25.9	28.3	23.9

It is difficult to know precisely what proportion of each DBS service provider's installed-base of subscriber dishes is mispointed. However, given current installation practices, EchoStar believes that "a very large number" of subscriber installations may have mispointing errors two to three times (or possibly more) the typical assumption of only a 0.5 degree error.[4] The validity of this belief was confirmed in a study prepared by RFK Engineering, LLC, commissioned by DIRECTV and submitted with its Comments as Appendix A (*DIRECTV Pointing Accuracy*). This study found that pointing errors at the test sites varied from 0 to 2.7 degrees, *with more than half of the test sites having pointing errors greater than 1.0 degree*, more than 20 percent with pointing errors greater than 1.5 degrees, and close to 10 percent with pointing errors greater than 2.0 degrees. (*DIRECTV Pointing Accuracy* at 1)

[4] "Current installation procedures for DBS dish antennas are ... based solely on peaking of the wanted signal, but the gain slope (gain versus mispointing angle) is almost flat, so it not a very accurate way to point an antenna. It is, however, the only practical way for DBS installations, and it has worked perfectly satisfactorily in the current 9° spacing environment." (EchoStar at A-11)

The prevalence of antenna mispointing in conjunction with the results shown in Tables 1 and 2 therefore paints a very disturbing picture. Table 2, which reflects the nine-degree homogenous situation – the approximate environment in which Region 2 DBS has been nurtured – shows relatively high C/I levels regardless of the degree of antenna mispointing. In contrast, Table 1 shows that C/I levels plummet with the addition of tweener satellites. Consider the substantial negative impact on a network if it were to experience, for example, the drastic change in first adjacent satellite C/I from 26.5 dB to 12.9 dB (see ITU-R BO.1213 reference pattern at one degree pointing error in Tables 2 and 1 respectively).

Moreover, with over 28 million existing DBS customers scattered all across the North American continent, site visits to correct pointing error would be an impractical and financially devastating undertaking.

As DIRECTV suggests, the impact tweener satellites operating at proposed power levels would have on existing DBS operations would be "...nothing less than catastrophic". (DIRECTV Comments at iii)

III. "First, do no harm" is the appropriate guiding principle.

Faced with the reality of the harm tweener satellites operating at proposed power levels could do to the existing DBS systems and the tens of millions of customers they now serve, Telesat agrees with DIRECTV that the guiding principle that the Commission must follow in determining whether the public interest would be served by allowing tweener entry is "First, do no harm" (DIRECTV Comments at 9). This is based on the fundamental premise that any failure to protect existing systems from increased interference caused by tweeners would be completely unjustified, as these billion dollar investments were planned and deployed based on technical criteria and orbital spacings agreed to internationally.

Both EchoStar and DIRECTV also note that there are other far less risky alternatives than tweener satellites for addressing the need for additional spectrum resources to serve DTH markets. (EchoStar Comments at 7-8 and DIRECTV Comments at 27-28) These options include FSS Ka-band and extended Ku-band frequencies. As of April 2007, 17/24 GHz BSS spectrum will also become available. Indeed, this latter possibility presents a green field opportunity unencumbered by any of the risks and challenges that tweener satellites are unlikely to overcome.

If the Commission remains intent on authorizing tweener satellites despite the aforementioned risks and concerns and the availability of other alternative spectrum capable of serving DTH markets, the guiding principle of "do no harm" will require that tight limits be placed on the operation of tweener networks to ensure that the viability and future growth potential of existing DBS networks is not threatened.

IV. The feasibility of reduced orbital spacing for provision of DBS service in the U.S. is not simply a domestic licensing issue.

As Telesat stressed in its earlier comments filed in response to the *DBS Reduced Spacing Public Notice* issued in December 2003,[5] the matter of reduced orbital spacing for DBS satellites operating in Region 2 has enormous implications for all Administrations and DBS systems operating in this Region. The 12 GHz DBS and associated 17 GHz feeder-link bands are internationally-planned bands governed by the Region 2 provisions set out in Appendices 30/30A of the ITU *Radio Regulations*. Indeed, as part of the *Radio Regulations*, the Region 2 Plan forms part of an international treaty to which the U.S. is a signatory. Changes to any of the technical provisions and parameters underpinning the Plan (including reduced orbital spacing) therefore cannot be implemented unilaterally by any one Administration. Changes can be arrived at only through discussions and agreement at the appropriate international venue.

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[5] See Telesat Canada Comments (23 January 2004) and Reply Comments (13 February 2004), *In the Matter of International Bureau Seeks Comments on Proposals to Permit Reduced Orbital Spacings Between U.S. Direct Broadcast Satellites*, Report No. SPB-196, 18 FCC Rcd 25683 (2003) ("*DBS Reduced Spacing Public Notice*").

DIRECTV voices a similar concern in this NPRM proceeding:

> "The Commission's creation of a 'third way' for tweener entry into the US DBS market could *effectively amount to unilateral revision of the Region 2 BSS Plan* in and around the portion of the orbital arc serving North and South American countries. As such, it would short circuit the ITU's process of inter-system coordination that has been in effect since the inception of the Region 2 Plan and undermine the Commission's own longstanding policy of allowing satellite operators to negotiate coordination agreements on their own behalf". (DIRECTV Comments at page iii) (emphasis added)

It is alarming that SES Americom appears to invite the FCC effectively to short circuit the international process by suggesting that the unsupported C/I criteria of 19 dB, based on an unacceptably low C/N threshold level of 5.6 dB, be imposed if coordination cannot be reached. (SES Americom Technical Appendix at 5) In pursuit of higher capacity systems to support HDTV, much more powerful modulation and coding schemes will be implemented – ones that inherently require much higher C/N thresholds and hence much higher C/I levels than SES Americom proposes. Accepting the SES Americom position would simply stunt the evolution of new DBS technologies.

It was noted that the Region 2 Plan was created in the early 1980s, based on analog modulation, and was therefore out-of-date by the time the DBS industry launched. (ManSat Comments at 3 and SES Americom Technical Appendix at 1) However, the modification provisions of the Plan have allowed evolution consistent with technological change. Indeed, while no satellites have been brought into service with technical parameters exactly reflecting the Region 2 Plan, the existing digital DBS networks have been designed and implemented within the technical confines of the current Plan criteria.

Moreover, as Telesat pointed out in its earlier comments filed in response to the *DBS Reduced Spacing Public Notice*, all the modifications to the Region 2 Plan submitted to date (including modifications filed by Argentina, Canada, Great Britain, the Netherlands, Mexico, and the U.S.) reflect not only advances in BSS technology but also the globalization of the satellite service marketplace. That is, without exception, these

modifications show digital transmissions with coverage footprints that include territory beyond the originally intended service areas.

The current Region 2 Plan framework has therefore proven itself to be extremely robust in the face of significant technological and global marketplace changes.

V. Conclusion

As DIRECTV notes, "[b]y any measure, DBS has been a smashing success story." (DIRECTV Comments at 4). The three North American operators currently serve over 28 million subscribers, many of whom are located in rural and remote areas where no terrestrial alternative is available. However, if these networks are to continue delivering quality service, a broad selection of signals, and innovative solutions to compete in the MVPD market, the Commission must exercise extreme caution in allowing any tweener or short-spaced satellites. Far from significantly augmenting overall capacity or stimulating new competition, there is substantial evidence that the interference caused by tweener networks operating at proposed power levels will in fact severely disrupt existing networks, resulting in the loss of service, or reduced service, to a significant portion of the current subscriber base, and/or industry crippling charges to restore service or lessen service impairments (*e.g.*, site visits to millions of locations to re-point antennas).

The Commission must also remain cognizant of the internationally agreed upon rules and procedures governing the ITU Region 2 BSS Plan. If it is felt that the current Plan could be improved upon, there are internationally agreed upon procedures in place which could guide that review process and would be fair to all Region 2 countries.

Respectfully submitted,

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